

in latitude N. 35° 35', longitude W. 75° 15', at 5.10 a. m. of the 25th.

SAND-STORMS.

Fort Thomas, Arizona, 8th, 9th, 15th, 28th.
Yuma, Arizona, 10th.
Turlock, California, 30th.
Lewiston, Idaho, 4th.

POLAR BANDS.

Lead Hill, Arkansas, 11th, 20th, 25th, 27th, 30th.
Riley, Illinois, 19th.
Wabash, Indiana, 19th.
Salina, Kansas, 5th, 15th.
Saint Louis, Missouri, 8th.
Clear Creek, Nebraska.
Vineland, New Jersey, 2d.
Charleston, South Carolina, 10th.
Nashville, Tennessee, 15th, 23d.
Woodstock, Vermont, 29th.
Cape Henry, Virginia, 1st.
Wytheville, Virginia, 4th, 17th, 21st.

ZODIACAL LIGHT.

Prescott, Arizona, 1st to 7th, 26th, 27th, 28th.
Pensacola, Florida, 30th.

Abstract of meteorological observations for the month of June, 1883, as reported to the Bureau of Agriculture, &c., of Tennessee, by voluntary observers in co-operation with General W. B. Hazen, Chief Signal Officer, U. S. A.

County.	Station.	Latitude north.	Longitude west of Washington.	Temperature.						Wind.		Number of days—												Observers.						
				Mean of 7 a. m.	Mean of 2 p. m.	Mean of 9 p. m.	Average monthly.	Highest.	Date.	Lowest.	Date.	Prevailing direction.	Greatest force.	Scale 0 to 10.	Date.	Clear.	Fair.	Cloudy.	Auroras.	Dew.	Fog.	Frost.	Lunar halos.		Solar halos.	Hail-storms.	Thunder-storms.	On which rain fell, including hail, snow, and sleet.	Total rainfall, including hail, snow, and sleet (in inches).	
Anderson	Andersonville	36 4	8 0	61	81	71	71	90	17	52	1	se.	br.	2	17	11	2	6	12	5.22	J. K. P. Wallace.	
Bedford	Flat Creek	35 30	9 40	71	81	70	73	89	23	59	1	sw.	h.	24	26	4	23	4	15	6.34	William Hart.	
Blount	Maryville, 960 ft.	35 45	7 00	71	79	72	75	91	18	56	1	w.	h.	4	3	15	12	.....	.....	4	.....	.....	.....	.....	.....	9	5.14	W. H. Henry.
Bradley	Grief	35 11	7 42	69	84	71	74	92	30	59	1	s.	br.	22	1	21	8	.....	.....	2	.....	.....	.....	.....	.....	7	5.34	J. T. Cowden.
Campbell	Caryville	36 00	7 30	66	78	67	70	85	12	51	1	w.	br.	5	2	11	17	.....	.....	7	.....	.....	.....	.....	.....	10	4.74	Fletcher Smith.
Carroll	McKenzie, 815 ft.	36 10	11 30	74	89	75	79	94	17	65	1	sw.	br.	5	21	15	5	10	14	3	8	3.65	John Brown.	
Cheatham	Kingston Springs	36 10	10 04	73	83	75	77	91	24	52	1	sw.	h.	9	6	17	7	11	4	1	2	14	4.41	W. J. Inman.	
Coffee	Beech Grove, 1,050 ft.	35 30	9 06	64	81	71	72	88	23	58	27	se.	h.	24	10	8	11	.....	.....	2	.....	.....	.....	.....	.....	13	4.83	B. F. Cheatham.
Coffee	Manchester	35 20	9 04	60	82	70	73	89	24	54	1	sw.	h.	10	2	14	14	.....	.....	3	.....	.....	.....	.....	.....	11	6.52	Wiley Hickerson.
Cumberland	Grassy Cove	36 00	8 00	61	74	64	65	86	16	57	1	s.	l.	7	15	8	5	7	9	4.39	Nettie M. Stratton.	
Crockett	Gadsden	35 45	12 00	.....	.....	.....	.....	.....	.....	.....	.....	nw.	h.	21	6	16	2	.....	.....	.....	.....	.....	.....	.....	.....	10	3.98	M. T. Moore, (27 d's)
DeKalb	Smithville	35 50	8 40	69	80	77	75	86	18	61	1	sw.	br.	4	6	11	13	6	1	2	6	4.00	P. C. Blum.	
Dickson	White Bluff	36 10	10 04	73	85	70	76	90	30	60	9	s.	h.	15	14	7	9	.....	.....	4	.....	.....	.....	.....	.....	8	4.40	Prof. McMillan.
Dyer	Dyersburg	36 15	12 20	71	83	71	75	90	16	58	1	s.	br.	17	6	5	19	.....	.....	18	.....	.....	.....	.....	.....	13	4.76	L. Hughes.
Gibson	Trenton	35 58	11 58	69	81	71	74	88	30	61	14	sw.	h.	8	22	3	21	6	5	4	10	12	A. S. Currey.
Gibson	Milan, 440 ft.	35 55	11 47	69	82	72	74	93	16	50	1	s.	br.	5	21	11	11	8	20	12	16	4.58	M. D. L. Jordan.	
Giles	Pulaski	35 15	10 00	72	83	73	76	93	24	58	1	.....	br.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13	6.08	Prof. W. T. Mann.
Greene	Greenville	36 10	7 49	70	82	75	75	89	15	55	1	sw.	br.	.....	16	7	7	.....	.....	2	.....	.....	.....	.....	.....	7	4.50	E. Link.
Hawkins	Rogersville	36 22	5 57	69	80	69	73	87	12	62	1	sw.	h.	4	25	4	12	14	1	3	12	5.89	Thos. F. Walker.	
Hardeman	Bolivar	35 18	12 00	70	83	77	77	90	17	59	1	s.	br.	22	14	8	8	.....	.....	1	.....	.....	.....	.....	.....	11	4.15	E. P. McNeal.
Hardin	Savannah	35 20	11 40	65	78	68	70	91	24	53	1	sw.	h.	6	22	17	5	8	.....	19	3	.....	.....	.....	.....	9	6.08	H. B. Hinkle.
Haywood	Brownsville	35 36	12 20	.....	.....	.....	78	97	18	53	1	w.	.....	.....	18	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	11	6.42	Daniel Bond.
Henry	Paris	36 33	11 25	71	73	72	72	84	24	63	1	sw.	h.	23	8	10	12	.....	.....	.....	.....	.....	.....	.....	.....	10	1.83	J. J. Travis.
Humphreys	Waverly	36 00	10 45	68	78	77	74	86	17	52	1	sw.	.....	.....	3	11	16	.....	.....	16	.....	.....	.....	.....	.....	9	3.03	D. R. Owen.
Lincoln	Howell	35 15	9 30	70	83	70	75	91	24	60	1	s.	br.	21	.....	9	21	.....	.....	8	.....	.....	.....	.....	.....	15	0.03	O. R. Hatcher.
Lauderdale	Flippin	35 45	12 30	72	81	76	76	92	24	63	11	s.	h.	22	3	14	13	8	W. P. H. Butler.
Marion	Fostoria, 1,200 ft.	35 10	8 50	63	80	64	69	85	16	48	1	w.	h.	12	19	11	11	Charles Foster.
Maury	Hardison's Mills	36 00	10 00	70	79	72	73	90	17	58	1	sw.	.....	.....	4	10	16	.....	.....	3	.....	.....	.....	.....	.....	14	7.52	Calvin Hardison.
McMinn	Chuckaluck	35 30	7 30	63	83	71	72	92	19	47	1	w.	br.	12	16	2	12	.....	.....	1	.....	.....	.....	.....	.....	8	5.79	Jacob Zeigler.
McNairy	McNairy Station	35 00	12 00	75	86	76	79	92	16	68	2	s.	h.	21	8	12	10	.....	.....	.....	.....	.....	.....	.....	.....	5	2.25	J. H. Blakely.
Montgomery	Sailor's Rest	36 24	12 35	.....	.....	.....	.....	.....	.....	.....	.....	s.	.....	.....	4	12	14	.....	.....	.....	.....	.....	.....	.....	.....	12	3.70	John Minor.
Overton	Livingston, 966 ft.	36 23	8 17	69	80	69	70	83	24	57	1	sw.	br.	.....	8	8	9	.....	.....	13	.....	.....	.....	.....	.....	10	3.90	J. Laughlin, (26 d's)
Polk	Benton, 880 ft.	35 12	7 45	71	72	71	71	96	23	55	1	sw.	br.	8	20	12	10	7	3.59	Jim Hood.	
Rutherford	Florence Station	35 53	9 36	71	85	72	76	93	24	57	1	sw.	.....	.....	7	11	12	.....	.....	.....	.....	.....	.....	.....	.....	12	7.08	C. F. Vandeford.
Rhea	Grand View, 1,635 ft.	35 45	8 56	75	73	74	74	90	18	60	1	sw.	h.	8	20	9	11	10	.....	.....	25	.....	.....	.....	.....	9	3.72	Hattie R. Stratton.
Smith	Near Alexandria	35 30	9 07	70	81	72	74	92	19	59	1	s.	h.	18	3	2	25	.....	.....	13	.....	.....	.....	.....	.....	12	8.32	Irene Beckwith.
Smith	Riddletown	36 19	12 38	74	83	71	76	92	19	59	1	sw.	h.	20	3	16	11	.....	.....	6	.....	.....	.....	.....	.....	17	6.82	S. P. Furgusson.
Tipton	Covington	35 30	12 38	74	83	71	76	92	19	59	1	s.	.....	.....	15	5	10	.....	.....	.....	.....	.....	.....	.....	.....	8	4.05	T. W. Roane.
Williamson	Franklin	36 00	10 00	70	81	73	75	89	24	62	1	h.	br.	.....	3	8	19	.....	.....	1	.....	.....	.....	.....	.....	12	4.31	Samuel Henderson.
Warren	McMinnville	35 45	8 45	74	83	78	78	94	17	62	1	s.	.....	.....	10	11	9	.....	.....	.....	.....	.....	.....	.....	.....	10	1.29	B. W. Sparks.

Mean temperature, 73°.

Highest temperature, 97°, on the 18th at Brownsville.

Lowest temperature, 47°, on the 1st at Chuckaluck.

Range of temperature, 50°.

Mean daily range of temperature, 16° 66.

Greatest daily range of temperature, 34°, on the 1st at Fostoria.

Wabash, Indiana, 5th.

Elk Falls, Kansas, 1st 10th.

Cambridge, Massachusetts, 2d.

Vicksburg, Mississippi, 17th.

Dyberry, Pennsylvania, 23d.

Nashville, Tennessee, 1st, 2d, 3d, 26th, 27th, 28th.

PRAIRIE AND FOREST FIRES.

Prescott, Arizona, 4th to 9th, 21st to 24th.

Yankton, Dakota, 7th, 30th.

Salt Lake City, Utah, 26th.

DROUGHT.

Bismarek, Dakota, 30th.—Crops are suffering from drought.

Barnwell, Barnwell county, South Carolina, 7th.—During the last six weeks but little rain fell in this locality, but the rain of this date greatly improved the crop prospects.

Livermore, Alameda county, California.—During the past week the weather has been excessively warm, which has proved very damaging to the grain crop. Much grain has been cut to be used as hay.

NOTES AND EXTRACTS.

The following meteorological summary and table are taken from the June report of the "Tennessee Weather Service":

Average number of fair days, 10½.
Average number of cloudy days, 11½.
Average number of days on which rain or snow fell, 10½.
Prevailing direction of wind, Southwest.

The "Missouri Weather Service," has issued the following report for June, 1883:

The mean temperature of the past month has been at the central station, 72° 9 which is 1° 6 below the normal of Mr. Engelmann's series. The average temperature throughout the state has been low for the month. The greatest change for any one day at the central station was on the 29th, when there was a range of 23° 9. The extremes for the month were 54° 6 for the minimum, on the 1st, and also on the 14th, and for the maximum, 89° 7 on the 29th. Cairo and Greenfield (both south) are the only stations reporting temperatures above the Saint Louis normal.

The rainfall throughout the state has been remarkably heavy. The amount for the month recorded has been at every station greater than the mean rainfall for June, according to Mr. Engelmann's series for Saint Louis, excepting the central station, Harrisonville, and O'Fallon. While we might expect local results from heavy rainfalls, yet it is to the wide-spread rains of

the past month that we must attribute the great floods that have done so much damage throughout the bottoms of the large rivers, as well as the local creek bottoms. It has been heaviest in the northwestern part of the state, gradually decreasing as we follow down the Missouri river bottoms to Saint Louis. The rainfall on the night of Saturday, the 17th, around Savannah, was greater than ever known there before for the same length of time. It has been exceeded only four times in Mr. Englemann's "heaviest rainfalls" for Saint Louis. At Louisiana there was a very heavy rainfall on the 16th, and on the 21st, a remarkably severe thunder-storm. It has been a remarkable feature of the storms of the past month, that the barometer has not generally shown the change that might have been expected to precede such results.

The storm of the 15th, was accompanied with hail in the western part of Saint Louis. Hail was also reported at Lexington on the 15th, and at Miami on the 20th.

On the 18th, DeKalb county suffered from a very severe cyclone. On the 22d, a cyclone originated in the northwestern part of the state, and traversed almost the entire state in a southeasterly direction. It extended over a wide tract of country, doing great damage to property.

Professor T. C. Mendenhall, of the "Ohio Weather Service," furnishes the following meteorological summary for June, 1883:

Report of the Ohio meteorological bureau. Summary for the month of June, 1883.

Number.	Stations.	Counties.	Mean barometer.	Highest barometer.	Date.	Lowest barometer.	Date.	Range of barometer.	Mean relative humidity.	Mean temperature.	Highest temperature.	Date.	Lowest temperature.	Date.	Range of temperature.	Mean daily range of temperature.	Greatest daily range of temperature.	Date.	Least daily range of temperature.	Date.	Number of clear days.	Number of fair days.	Number of cloudy days.	Days on which rain fell.	Total rainfall for month.	Average daily rainfall.	Direction of wind.
1	Cincinnati	Hamilton	29.974	30.343	1	29.644	10	.699	67.7	73.6	89.5	17	57.0	1	32.5	15.1	24.0	2	7.0	22	7	14	9	21	3.61	.120	sw.
3	Dayton	Montgomery	29.977	30.341	1	29.604	10	.737	70.0	70.4	88.0	24	46.2	1	41.8	19.1	27.0	23	13.2	17	8	15	13	5.69	.189	se.	
4A	Lima	Allen	29.977	30.377	1	29.633	10	.744	74.0	69.8	82.2	23	36.0	1	56.2	26.4	44.5	1	14.8	11	8	10	12	11	4.51	.150	sw.
4B	Sidney	Shelby	29.962	30.368	1	29.589	10	.779	73.0	69.4	82.2	16	38.0	1	51.2	25.3	38.0	2	11.7	26	5	16	9	15	5.27	.175	sw.
5	Upper Sandusky	Wyandot	29.962	30.368	1	29.589	10	.779	73.0	69.4	86.5	16	39.0	1	47.0	19.9	34.0	2	10.5	27	23	2	5	17	6.21	.207	sw.
6	Wauseon	Fulton	29.980	30.390	1	29.490	10	.800	79.0	66.5	89.0	17	34.5	1	54.5	21.8	39.4	2	6.7	10	3	13	14	18	4.73	.157	sw.
7	Lebanon	Warren	29.980	30.390	1	29.490	10	.800	79.0	66.5	84.8	18	47.1	1	37.7	16.7	31.0	2	7.7	2	10	10	17	7.28	.242	sw.	
8	N. Lewisburg	Champaign	29.980	30.390	1	29.490	10	.800	79.0	66.5	86.2	18	44.5	1	41.7	17.6	32.5	2	5.0	25	6	15	9	18	6.20	.206	sw.
9A	Levering	Knox	29.980	30.390	1	29.490	10	.800	79.0	66.5	82.8	18	40.1	1	42.7	18.4	30.4	1	10.4	10	12	15	3	13	4.37	.145	sw.
9B	Gambier	Knox	29.980	30.390	1	29.490	10	.800	79.0	66.5	88.0	17	45.0	1	43.0	15.3	26.0	2	6.0	10	3	17	10	12	2.57	.086	sw.
10	Toledo	Lucas	29.980	30.339	1	29.508	10	.831	69.0	69.7	88.0	17	45.0	1	43.0	15.3	26.0	2	6.0	10	3	17	10	12	2.99	.100	h.
11	Ironton	Lawrence	29.984	30.300	1	29.687	10	.613	71.1	71.1	89.0	23	45.5	1	43.5	22.9	39.4	2	11.9	21	6	10	11	18	5.30	.176	h.
12A	Washington	Fayette	29.984	30.300	1	29.687	10	.613	71.1	71.1	89.0	23	45.5	1	43.5	22.9	39.4	2	11.9	21	6	10	11	18	4.55	.151	h.
12B	Waverley	Pike	29.984	30.300	1	29.687	10	.613	71.1	71.1	96.0	18	45.0	1	45.0	25.8	39.0	16	11.2	5	8	15	7	15	3.93	.131	sw.
13A	Columbus	Franklin	29.952	30.326	1	29.604	10	.722	68.8	69.8	89.0	5	48.0	1	41.0	18.0	28.0	2	9.0	21	8	18	4	17	4.25	.142	h.
13B	O. S. University	Franklin	29.952	30.326	1	29.604	10	.722	68.8	69.8	88.0	18	43.0	1	45.0	23.6	36.0	2	14.0	10	11	13	6	15	4.70	.156	sw.
13C	Westerville	Franklin	29.952	30.325	1	29.596	10	.729	81.7	67.7	87.0	5	42.0	1	45.0	21.6	35.0	2	11.0	25	9	15	6	10	3.93	.131	sw.
14	Oberlin	Lorain	29.967	30.361	1	29.639	10	.722	70.0	67.7	90.3	23	45.0	1	55.3	28.6	44.0	2	13.5	13	8	16	6	12	3.40	.113	h.
15	Marietta	Washington	30.003	30.343	1	29.689	10	.654	78.0	70.6	88.0	5	48.3	2	39.7	20.4	35.2	2	10.6	7	9	10	11	14	3.29	.109	sw.
16	Granville	Licking	29.952	30.325	1	29.596	10	.729	81.7	67.7	86.0	16	43.0	1	43.0	21.1	33.5	13	12.0	21	11	5	4	5	1.87	.062	sw.
17	Quaker City	Guernsey	29.952	30.325	1	29.596	10	.729	81.7	67.7	87.0	5	42.0	1	45.0	21.6	35.0	2	11.0	25	9	15	6	10	3.93	.131	sw.
18	Canton	Stark	29.954	30.325	1	29.637	10	.688	75.0	67.7	86.0	17	40.0	1	46.0	21.8	33.7	14	13.4	11	7	19	4	14	4.10	.136	sw.
19	Warren	Trumbull	29.954	30.325	1	29.637	10	.688	75.0	67.7	89.2	17	40.0	1	49.2	22.0	34.3	14	12.0	15	5	16	9	14	3.19	.106	sw.
20	Wooster	Wayne	29.966	30.344	1	29.633	10	.711	77.0	67.4	84.5	5	41.0	1	43.5	19.6	27.5	15	10.0	10	10	14	6	11	3.41	.113	h.
21A	Cleveland	Cuyahoga	29.930	30.307	1	26.541	10	.826	69.1	67.3	85.5	18	44.4	1	41.1	10.2	30.2	2	7.3	27	9	15	6	17	3.77	.126	h.
21B	Cleveland	Cuyahoga	29.930	30.307	1	26.541	10	.826	69.1	67.3	87.0	18	42.5	1	44.5	19.6	33.0	2	10.0	11	7	15	8	17	3.90	.130	h.
	State		29.955	30.377	1	29.490	10	.887	75.5	69.0	92.2	23	34.5	1	57.7	20.69	44.5	1	5.0	25	8.5	13.7	7.8	14.5	4.25	.141	sw.

NOTE.—The means are computed only from station reports covering the entire month, and when instruments have been compared with standards.

The following note is also taken from the report of the "Ohio Weather Service":

The railway weather signals were continued during June, and by examination of reports from Columbus, Westerville, Gambier, Wooster, and Canton, and special reports by Mr. S. H. Marchaud, of Millersburg, it is found that eighty per cent. of the predictions have been verified.

The following summary has been forwarded by Mr. S. R. Thompson, director of the "Nebraska Weather Service.":

The month was characterized by a very heavy rainfall, especially in the southern and eastern parts of the state, and by very hot weather in the last decade.

Rainfall.—The average by sections was as follows: southeast, 12.80 in.; northeast, 7.83 in.; southwest, 4.99 in.; northwest, 4.81 in. Average for entire state, 7.61 in.

Temperature.—The mean temperature of the air was 70.68. The average of all noon observations was 76.20. The following are some of the maximum and minimum temperatures: Omaha, maximum 95.0°, minimum 44.6°; North Platte, max. —, min. —; De Soto, max. 93.0°, min. 28°; Agricultural College, max. 96°, min. 42°.

Mean relative humidity.—Omaha, 69.3, North Platte —, Agricultural College 82.63, De Soto 60.3.

Wind.—Number of miles travelled—Omaha 2,255, North Platte —. Mean direction—Omaha north, North Platte —, Agricultural College west. Greatest velocity—Omaha 38 miles southeast. North Platte —.

Miscellaneous.—At Red Willow on the first the mercury fell from 92° to 60° in two hours and one-half and the wind whirled from southeast to southwest in 15 minutes, a swift breeze following. At the same place a brilliant sundog was seen north of the sun on the 9th. At Superior at 2 a. m. on the

24th a terrific storm of wind, thunder and lightning and hail occurred. About two inches of rain fell, and considerable damage was done to buildings, &c. Hail the size of peas fell at Syracuse on the 1st, doing great injury to crops.

G. W. Knights, observer at Inavale, Webster county, writes that on the 18th, at 3.35 p. m. a heavy storm of wind, hail, and rain entered the county at the southwest corner, passing in a northeasterly direction. The storm was from three to five miles wide. It did great damage to both fruit and forest trees, wrecked several buildings, and severely hurt a few people. Hethinks the corn will recover and make a light crop.

At Table Rock the Nemaha was three feet higher than ever known before. A heavy storm of wind, thunder and lightning, rain and hail on the 16th is reported at Sargent.

The following extract is taken from the report of the Illinois Meteorological Service for June, 1883.

SEASON.

June, 1883, was cooler than the same month in 1880, 1881, and 1882. The average rainfall at stations in the three divisions of the state, for June, 1883, of 5.85 inches was not as heavy as the precipitation of June, 1881 and 1882, but considerable more than for the corresponding month in 1878, 1879, and 1880.

The past month was cooler and the precipitation greater than that of the average of the month of June for a term of years.

TEMPERATURE.

The mean temperature for the past six Junes in the three divisions of the state is given in the following table:

Division.	1878.	1879.	1880.	1881.	1882.	1883.
Northern	67.0	65.0	70.0	66.0	68.2	67.3
Central	68.0	70.0	73.0	71.4	71.2	69.1
Southern	72.0	73.0	73.0	74.5	74.4	72.7
Average	69.0	69.3	72.0	70.7	71.3	69.7

Northern division.—The mean temperature of June, 1883, at stations in the northern division of the state is a fraction warmer than the average of the past six years.

The month of June, 1879, was the coolest, and June, 1880, the warmest since 1877, at stations in this division.

The mean temperature in the northern counties for the period from January 1 to June 30, 1883, was lower than for the corresponding periods of the past six years.

Central division.—At the several stations in this division, the mean temperature of June, 1883, with the exception of June, 1878, was the coolest June on record. The mean temperature of June, 1880, was the highest, and that of June, 1878, was the lowest of any corresponding month at the stations in the central counties since 1877. The mean temperature of this division for the six months ending June 30, 1883, was lower than the corresponding periods since 1877, with the exception of 1881.

Southern division.—The mean temperature of June, 1878, was a fraction lower than the mean temperature of June, 1883, in this division. The mean temperature of June, 1878, was the lowest, and June, 1881, was the highest since 1877. The mean temperature of the southern counties for the six months ending June 30, 1883, has not been lower in any corresponding period during the past six years, and is the same as in 1881.

RAINFALL.

There was, with one exception (June 1st), rain on every day during the past month in some portions of the state. The rains were quite general over the state on the 2d, 6th, 8th to 12th, 15th to 18th, 20th, 21st, 23d, 25th, 27th and 28th. There were local rains at stations in the northern counties on the 3d; at points in the southern division of the state on the 13th, 14th, 19th, 22d and 30th. The average number of days on which rain fell at the several stations in the month of June was, as follows: northern division, 9; central division, 13; southern division, 10. The heaviest rainfall reported for June was 8.8 inches, at Griggsville, Pike county; the smallest, 3.15 inches, at Pana, in Christian county; while the average precipitation in June for all the stations in the state was 5.85 inches.

The following table gives the average amount of rainfall in the three divisions of the state during the last six Junes.

Division.	1878.	1879.	1880.	1881.	1882.	1883.
Northern	3.41	3.93	5.32	7.86	7.55	4.67
Central	3.69	2.80	2.64	7.35	10.05	5.98
Southern	2.29	4.59	3.63	4.58	5.76	6.91
Average	3.13	3.77	3.86	6.59	7.78	5.85

The average rainfall at stations in the southern division during the month of June, 1883, exceeded that of June during the past six years.

The average precipitation of 5.85 inches for all stations in the state was exceeded in 1881 and 1882, in which years the averages for the state were 6.59 and 7.78 inches respectively.